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Arthur S. Loevenhart
(December 29, 1878 - April 20, 1929)

With best wishes for
the "Biographischen Lexikon"

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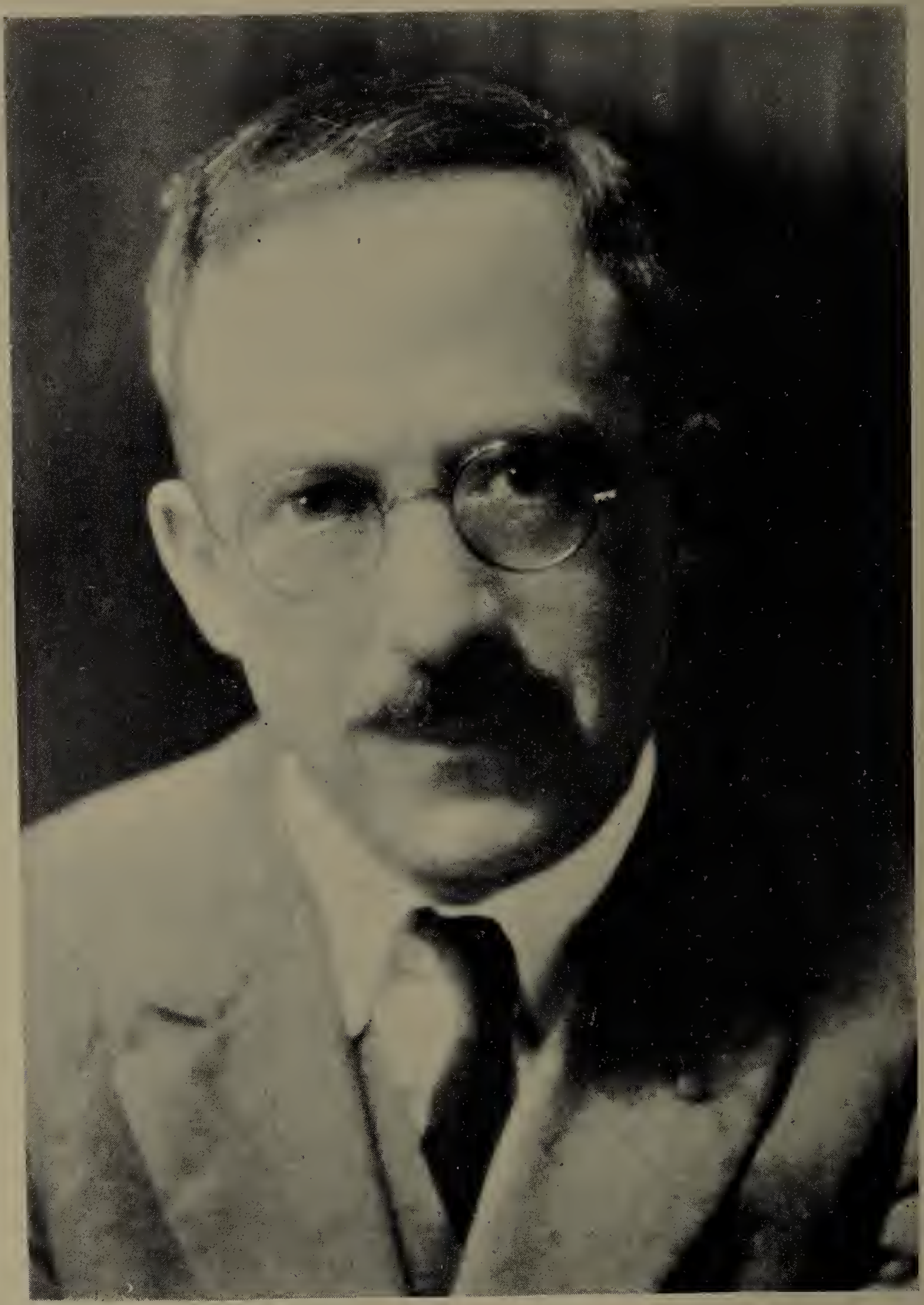

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In spite of its achievements, pharmacology is still to be recognized in America as an important factor in medical progress. With the growth of the science and its application to so many varied interests, it cries for wise leadership, lest it lose itself in a maze of theory, or in the darkness of practical or commercial expediency. The unfortunate death of Professor Loevenhart is thus a peculiarly severe blow to his scientific colleagues, for it has robbed them of an enthusiastic friend and a cheerful counselor, generous with brilliant ideas, alert to practical affairs, and courageous but careful in judgment.

Loevenhart's influence in pharmacology may be estimated by surveying his publications. These began under J. H. Kastle in Lexington, Kentucky, where, on hot summer days, research was often conducted (as Loevenhart has related) on the vine-covered back-porches of Kastle's or his own home. Chiefly on enzyme action, these early experiments were continued by Loevenhart after completing his medical course at the Johns Hopkins University in 1903. Here he came under the influence of J. J. Abel, and W. H. Howell.

Biological advance in the new century was auspiciously begun by the report of Kastle and Loevenhart in 1900 on the reversibility of enzyme action. A typically "vital" phenomenon was shown to be limited by the factors involved in an ordinary chemical reaction, by proving that the hydrolysis of ethyl butyrate by lipase is incomplete; that the hydrolysis is inhibited by the products of the reaction, and that ethyl butyrate may be synthesized by lipase from butyric acid and ethyl alcohol. In 1902 Loevenhart extended this youthful study to a theory of "Lipogenesis," in which he described the distribution of lipase in the body, and its relation to fat absorption, deposition, and metabolism. He also investigated the inhibiting effect of sodium fluoride on lipase action, a study to which he returned within a year of his death.

Loevenhart was quickly acknowledged by these biochemical contributions as destined for a successful scientific career. He remained for some years at the Johns Hopkins University, associated in teaching and research with the Departments of Physiological Chemistry and Pharmacology. In 1906 he was promoted to an Associate Professorship in Physiological Chemistry and Pharmacology, both of these subjects being at that time still in charge of Professor Abel, with Walter Jones as Associate Professor of Physiological Chemistry. In this environment at Baltimore he developed a capacity for inspiring those in contact with him by his characteristic self-effacing modesty in promoting and often performing valuable research credited to his students. While here he also had the opportunity of aiding in the development of THE JOURNAL OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS and in the organization of the American Society for Pharmacology and Experimental Therapeutics. Of the latter, he was treasurer from its establishment in 1909 until 1916 and served as president in 1919 and 1920.

Upon assuming the newly created chair of Pharmacology and Toxicology at the University of Wisconsin in 1908, Loevenhart energetically tackled the problem of biological oxidation. His interest in this difficult field had been aroused by previous work on oxidizing ferments. From his laboratory have appeared many papers on various aspects of the effects of reduced oxidative processes on living tissue. Much of this research was done in a cramped attic of an antiquated chemical engineering building. From the theoretical side these oxidation studies have been fruitful in explaining bodily changes in anoxic conditions, and they have consistently emphasized oxidative processes as the chief source of energy in the living body. They have indicated the mechanisms by which the body adjusts itself to oxygen want; the significance of the response of the medullary centers to lack of oxygen; the type of acidosis encountered, and the cause of death in anoxemia. Practically, this general problem has suggested methods of stimulating portions of the central nervous system;

it has been applied to the determination of circulation time, and it is receiving current applications in medicine. The value of the salts of iodoxy-benzoic acid in infectious arthritis has been demonstrated, and clinical trials are showing the worth of a benzoyl-peroxide ointment as an efficient antiseptic agent which rapidly promotes healing in chronic skin ulcers or in infected lacerations,—both propositions suggested by Loevenhart as a result of his pharmacological studies. His investigations on biological oxidation were summarized to 1915 in a Harvey Society Lecture. Death intercepted the preparation of a summary to date.

With the entrance of this country into the World War, Loevenhart took an active part in the organization of the research activities of the Chemical Warfare Service. His fine chemical training facilitated the work he was called upon to do in contact with the leading chemists of the nation. The success of the coöperative efforts between chemists and pharmacologists in developing toxic agents for war use suggested to him that a similar project might result more happily if applied to the therapeutic problems of peace. Venereal disease is one of the greatest of these. Through contact with the work of the Wisconsin Psychiatric Institute, Loevenhart saw an opportunity here in connection with the then almost hopeless task of treating neurosyphilis, especially paresis. Accordingly, as soon as the war was over, he organized a coöperative research joining the chemical laboratories of Northwestern University, the pharmacological laboratory of the University of Wisconsin, and the clinical facilities of the Wisconsin Psychiatric Institute, in an attempt on this problem. This effort has been described elsewhere. As it progressed, interesting aspects of the chemistry and pharmacology of various arsenical and mercurial compounds, and many points of immunological significance were observed and reported. Among the achievements of this long study have been the discovery of the value of Tryparsamide in neurosyphilis; the observation that only those arsenicals containing an amino or substituted amino group in the para position to the arsenic appear to be especially toxic for the optic tract; the discovery of Etharsanol and Proparsanol as effective trypanocidal agents, and the finding of unsymmetrical arseno compounds of definite trypanocidal and spirocheticidal action. So successful was this coöperative undertaking that Loevenhart proposed its general extension in a "Therapeutic Institute Devoted to Finding Better Methods of Treating the Sick." It is lamentable that there is no specific therapeutic institute in existence such as he visualized.

One might suppose that Loevenhart's entire energy since the war would have been spent in this coöperative activity. It seemed only a spur, however, to many other unrelated pharmacological investigations. He studied two series of procaine derivatives from the standpoint of the relation between their pharmacological action and their chemical composition, and he determined their therapeutic indices with great accuracy. As a result of this study, he persuaded several chemists to attempt the synthesis of new types of local anesthetics, some of which seem very promising.

Loevenhart consistently evinced an interest in the pharmacology of the central nervous system. He inaugurated a systematic research into the symptoms and treatment of experimental nervous exhaustion, and he investigated cerebral stimulation in shock, dementia praecox, and similar states. Part of this work culminated in the striking discovery that carbon-dioxide inhalations of suitable concentration with oxygen will induce periods of mental lucidity in cases of typical catatonic dementia praecox.

A more technical subject in which Loevenhart became engaged was the pharmacology of the nitrates and nitrites. This work showed the relation between the relative rates of alkaline hydrolysis of the various esters and the intensity of their action, and elucidated the factors concerned in the headaches caused by these agents. Cross tolerance between them was also studied, as well as the rate of disappearance from the blood after intravenous administration.

During the last five years of his life, Loevenhart suffered greatly from the peptic-ulcer syndrome. His unfailing good humor and remarkable stamina in the face of his constant distress was a marvel to his friends. Indeed, he turned his own experiences to practical clinical use in reporting on calcium carbonate in the treatment of this condition. What more courageous spirit?

Loevenhart's genius was distinctly scientific, and of that sort which expresses itself best in chemical and general biological problems. In clinical medicine this genius is really not at home. But Loevenhart's clinical training kept him alive to the practical problems of professional medicine, and tempered his scientific curiosity with concern for the affairs of men. His acute social conscience was revealed in his determination to better the therapy of mental diseases, in his sensible defense of medical research, and in his continual public exposure of fraud and quackery.

Always a keen analyst, as his joy in chess might indicate, Loevenhart was fond of toxicological mysteries. By the establishment of the State Toxocological Service in Wisconsin in conjunction with his own laboratory, he displayed his wisdom in helping to stabilize an abused medico-legal activity. The contributions to public health from this service have fully justified its maintenance and extension.

Loevenhart was a great teacher. His remarks were always intriguing and were memorable for their spontaneous wit. His amusing anecdotes, of which he seemed to have an inexhaustible supply, were traditional features, not only of his lectures and conversations, but even of such assemblies as the Federation of American Societies for Experimental Biology of which he was Chairman in 1920. Of him as a teacher, it has been stated by the Regents of the University of Wisconsin: "Eager to stimulate and aid in the full development of promise displayed by those who sat to him for instruction, he deliberately sacrificed the possibility of even greater scientific accomplishment in the interest of vicarious achievement through his pupils. Teacher and scientist he was, but above all a humanitarian, a healer of men. . . . ."

A most important aspect of Loevenhart's research was the torturing care with which he insisted that every detail be carried out. In the composition of his papers he was especially meticulous. After receiving the criticisms of friends, to whom they were always submitted, they were often rewritten half a dozen times or more before publication.

Loevenhart's success as a teacher, and his personal influence as a friend and companion is indicated by the large group of pharmacologists who are his pupils, and who now, in their own laboratories, have the honor of carrying forward his noble ideals, and his genial and generous spirit.

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In addition to the above, there are eighty papers from Loevenhart's laboratories, in which his name does not appear, but toward which he rendered aid or advice.